

## THE MECHANISM OF INTERACTION OF NATURAL PHYSICAL FACTORS AND THE INTEGRAL ORGANISM FORMS THE BASIS OF THE GENERAL THEORY OF PHYSIOTHERAPY

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**Abstract:** Optimal combination of drug therapy and physical factors increases the efficacy of treatment and medical rehabilitation of patients. It is regrettable that the search for methods to improve the individual dosing of the applied energies with an approach to the cellular level of dynamicity (constant correction of parameters of the applied physical factors during the whole period of the treatment) and comprehensive (in the presence of several diseases) treatment are clearly insufficient for the present time. Perhaps such a search is difficult due to the current lack of a general theory of physiotherapy and imperfect classification of physical factors. Thus, it became necessary to develop principles and methods for a comprehensive study of the effects produced by the physical methods in a clinical setting, and the requirements for testing new devices for physiotherapy sharply increased. The author of this doctrine was an outstanding scientist Vladimir Sergeyevich Ulashchik. In his opinion, the creation of a general theory of physiotherapy is one of the promising tasks of the scientific physiotherapy.

It is known that since the end of the XIX century, the principles of nervism and reflex theory have been the theoretical basis of domestic physiotherapy. Influence of humoral and endocrine changes was further added to the reflex theory of the mechanism of the therapeutic effect of the external environment (natural and preformed physical factors), but still with the leading principle of nervism.

It should be noted that there have always been doubts about the exhaustive explanation of the reflex theory of all causes and consequences of the interaction of external physical factors with the human body.

Based on this, the "permanent" problems remained unresolved:

- The general and the specific in the action of physical factors;
- Their action selectivity;
- Correlation between the nervous and the humoral, the local and the general, the functional and the morphological with a single and course application of physiotherapy;
- Impossibility to determine the "dose-effect";
- Nature of the body's primary reactions to the external environment;
- Direction of the processes that determine the final result of the interaction of external physical factors and the integral organism;
- Implementation of all potential possibilities of obtaining the maximum desired positive clinical effect during physiotherapy.

Thanks to the huge success of quantum mechanics (optics), chemistry, biology, supramolecular chemistry, fiber-optic physics, it became necessary to revise the mechanism of action of the physical factor and the response of the integral organism in order to diagnose, prevent, treat and rehabilitate patients.

Quantum therapy originated before the Common Era, when a man began to consciously apply "natural factors" for therapeutic purposes with a controlling "verbal support and explanation." The philosophy of using natural factors for therapeutic purposes changed with further development of scientific, technical and humanitarian disciplines (mathematics, mechanics, physics, chemistry, biology, etc.). At the same time, the culture of external influence on the integral organism of any forces and means changed and improved, i.e. the use of "natural factors" for therapeutic purposes acquired a systemic nature with further emergence of a new scientific discipline in medicine, i.e. "physiotherapy". Its fundamental nature is that the entire Universe, the Cosmos and the World around us consist of elementary particles (quanta), which are unique and exist in three-dimensional measurement.

**Keywords:** Evanescent IR spectroscopy, quantum tunneling, "super-perfect energy information field", general theory of physiotherapy.

**Introduction:** Early diagnosis of diseases and monitoring of the course of the detected disease are urgent tasks of contemporary medicine.

If we consider a man as a particle of Nature and accept that all biological processes in his/her organism proceed according to a "Program", in the strictest cosubordination, from elementary particles to complex structures, the idea of identity between the laws of the World around us and those of the Universe inevitably arises.

Then it should be accepted that all human vital activity, all the smallest biological processes in the organism obey the Highest Law of the Universe – the principle of "direct and reverse link".

A man is a sophisticated nonlinear system consisting of a great number of various functional unique structures.

In this regard, it is necessary to create a system of rapid restoration of comfort of organs and systems stability of the integral organism, thanks to an individual approach in combination of parameters of natural and preformed physical factors with medications.

In this regard, the research topic chosen by the author is relevant from the point of view of early, safe non-invasive diagnosis of diseases of internal organs and systems from the skin surface. It is aimed at improving individual comprehensive physiotherapy through the developed minianomicroscope (nanosensor).

**Scientific novelty:** This paper formulates for the first time the important concepts of "mechanism of interaction between the environment (natural and preformed physical factors) and the integral organism on the basis of experimental studies:

1. The existence of integrated imperceptible, intangible and invisible "super-perfect energy-informational field" that fills the entire space

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between elementary particles, atoms, molecules, cells, organs of the integral organism, the outside world and outer space with all its contents.

2. A man is a part of the "energy information system" of the Universe and their interrelation is carried out through the perspiration system of the integral organism.
3. "Energy-informational diagnostics" in the integral organism is carried out by means of quantum tunneling.

**Scientific significance:** The scientific significance of the paper consists in expanding and enhancement the knowledge of the basis of the "Universe", the controlling and stabilizing system of comfortable coexistence of all the contents of the outside World and the Cosmos.

In this regard, it defines the leading place of man in the biosphere – the noosphere, as the most sophisticated and intelligent being of the Nature.

**Introduction:** It is impossible to imagine the world medicine of the XXI century without the use of natural and preformed physical factors. No country in the world has a practical, theoretical and experimental medicine that corresponds to the level of development of physics, chemistry, supramolecular chemistry, quantum physics and optics.

It should be understood that the fundamental study of the organs and systems of the integral organism as an integral part of the Universe and the Cosmos at the supramolecular level is the progress of medicine, expressed in the duration of a comfortable life.

The scientists of all disciplines presumably need not be convinced that a man is the "most organized particle" of nature and by position has the same rights as all visible and invisible objects of the Universe and the Cosmos. But a man has a very modest knowledge of the mysteries of the Universe. Scientific medicine develops slowly. This fact appears to be true, if one compares the situation in it with what is happening in quantum chemistry. However, it should be borne in mind that a human being is a sophisticated nonlinear system and the

main condition for a comfortable existence of the organism is the preservation of the "constancy of the energy asymmetry" of the internal environment, being a modern concept of homeostasis.

There is a biological system, namely the cardiovascular system functions so flawlessly that it prevents all disturbances at the supramolecular level.

When autoregulation becomes insufficient to maintain normal body functions, it results in a pathological process development (disease). In this regard, it is advisable to conduct a functional study of the physical-chemical properties of all organs and systems of the integral human organism in normal state and in a state of pathology from one month to 80 years of ages (create a data bank). This makes it possible to compensate from the outside for the energy of certain body systems with a pinpoint accuracy and thus restore homeostasis.

Energy exchange is carried out through the "perspiration system" both inside the integral organism and between it and the biosphere. It means that the perspiration system functions everywhere: inside the cell, in the intercellular space, in the inter-organ space and between the integral organism and the biosphere.

It must be remembered that information does not exist independently, nor can any physical category exist independently.

In this regard, science should recognize the existence of integrated energy that is present everywhere; recognize the inseparable nature of "time, matter, space and information".

The original code of information changes synchronously with changes in "time, matter and space" because it reflects their content.

Given that each cell, organ, system has its own unique physical and chemical properties, confirming its own information, defining the difference between the information data of the pathological process and the "Data Bank" is a diagnostic process.

Autoregulation of the integral organism is carried out by the cardiovascular system.

The theory of brain structure and operation includes infinitely many various data on how the structures

of the brain and the integral organism can interact with each other when a thought implementation program is received from the heart. The dominant function of the brain is to control the motion, which is infinitely diverse by its physical-chemical properties, at the quantum level. This is a superperfect executive power over the vital activity of the integral organism.

It is an independent science that goes beyond the classical concepts and carries out the successive programs implementation.

Computational neurobiology of the brain is not identical to mathematical analysis and computer modeling, but represents a mystery of biocomputer modeling at the quantum level, providing for superperfect programs implementation as part of preserving intracellular homeostasis of the integral organism and the biosphere.

Artificial intelligence studies the programmed operation of computers to obtain "intelligent" behavior, where a provision for the relationship between structures in the brain program can be prohibited.

Explanation of the prohibition of external action on the brain structures:

1. The biological mechanism of the functional structures of the brain at the quantum level has been very poorly studied.
2. There is no scheme of interaction between brain structures and between all existing structures of the integral organism at the quantum level.
3. Morphological and functional changes in the structures of the brain and the integral organism at the quantum level have not been studied when the brain structures are exposed to the external action.

Based on the above, the rightness of the creation and improvement of robotics appears to be unclear.

The robotics is acceptable to be used when performing simple functions and tasks now.

**Investigation of the physical properties of the "time – universe" (TU)**

"Time-Universe" is supposed to be considered the smallest quantum particle in three-dimensional space. This is the only number of dimensions.

The existence of an infinite number of bends of any matter are not dimensions, but they are created and built on the basis of three dimensions, but with individual speed and at individual scale.

If we cannot measure or calculate one of the three dimensions because of its very small size, then it is theoretically impossible to deny its existence.

The smallest elementary indivisible particle (TU) is provided with an individual program for creating matter, form and space as a whole.

When infinitely different clusters of elementary particles are formed, their parameters change, i.e. each elementary particle has a program that changes infinitely, depending on the number and shape of the clusters formed (therefore, the content of matter will be infinitely different in terms of the defining properties of the entire Universe as a whole).

Thus, each elementary particle of the Universe contains a complete program of all cyclic processes, which are infinitely different in speed and scale, ensuring the eternity of the Universe.

"Time-Universe," matter, space" is an inseparable unity, i.e. they are monolithic, there is no distance between them. This is the mystery of the Nature.

"In the exact sciences, the time direction is considered as a property of physical systems, not as that of time.

In natural science, the direction of time exists permanently and it is associated with the fundamental difference between causes and effects.

It is necessary to consider the second possibility using the exact sciences methods.

From this point of view, time becomes a phenomenon of nature, and not just a fourth dimension complementing the three-dimensional space.

Then the time intervals measured in seconds should have some more physical properties.

Unlike the passive geometric property of time, its physical properties must be active. Indeed, if they are real and are not the results of a subjective perception of the world, then they should be revealed in action on material systems.

This means that time, as a certain physical environment, can affect substance, the course of

processes and link together a wide variety of phenomena, between which, it would seem, there is nothing in common. This view of time is perfectly reasonable. But only rigorous experiments of the physical laboratory can prove it." [N.A. Kozyrev]

In this regard, we can safely assume that "Time-Universe" (TU) is a special programmed energy for the possibility of transition to a specific matter-space, only in three-dimensional measurement, but with an infinitely different number of bends.

The program of the "Time-Universe" contains a clear sequence of actions of the stabilizing force (ISPSFU) located within in all operations of transition to matter-space at the quantum level.

"Time-Universe" can be outlined in three parts: matter, form, space

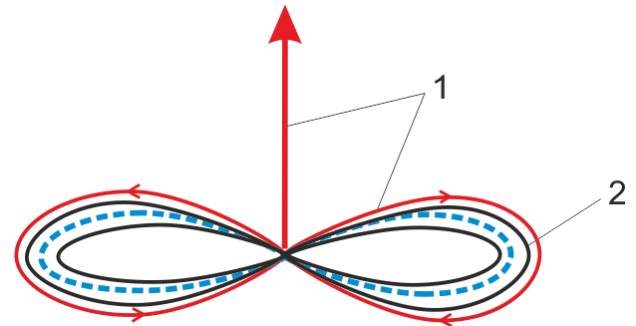


Fig. 1. Scheme of the smallest elementary indivisible particle

(SEIP) - "Time-Universe" (TU)

1. Integrated super-perfect stabilizing force of the Universe (ISPSFU).

2. Matter-Space (MFS)

(MFS – matter, form, space – an integral whole, the shape depends on the number of bends of matter).

According to the main postulates of Nikolai Kozyrev's "time", the "time" affects any processes and constitutes their necessary component.

Everything in nature happens either with the time release or time absorption.

Time is a source of energy. Calculations carried out by Kozyrev showed that the activity of stars is due not only to internal nuclear reactions, as, in this case, they would shine for 4-5 billion years, while their life lasts much longer. This means that the stars receive additional energy from the outside space.

In this regard, it is difficult to agree with the opinion of Landau and Lifshits that a quantum particle can be in one of two states, i.e. pure or mixed. It should be assumed that a quantum particle can only be in a mixed state, because in its movement path it can change the state of all contact quantum particles and all systems consisting of them. There are no free passages for the movement of pure quantum particles in the outside world, i.e. there are no free spaces.

On this basis, we proposed our own concept that the energy source of the Universe is the eternal, infinite motion of the smallest elementary particles (TU) with infinitely different speeds and at infinitely different scales (Fig. 1).

The outside world and the Cosmos with all visible and invisible contents constitute the "invisible, imperceptible, intangible super-perfect stabilizing force - the source of the cyclic process of the Universe."

In this cyclic process, "man" is the most organized unit of the Nature and the Cosmos, but so far has very modest cognitive possibilities to perceive the mysteries of the cyclic process of the Universe.

It should be assumed that all the smallest elementary indivisible particles (SEIP) are endowed with different programmed physical properties (guarantor of the motion eternity), providing them with freedom, submission and humility in their perpetual motion with infinitely different speed and scale.

The following postulate of Kozyrev: time is an active substance that maintains the balance of our World, does not spread like light, but appears everywhere at once. Based on our own experimental research, we believe that Kozyrev's time is the "Time of the Universe" as the smallest elementary indivisible particle (SEIP). The universe consists of an infinite number of them, and each elementary particle (SEIP) contains a programmed invisible intangible super-perfect stabilizing force that helps maintain the balance of our World. We also believe that on the basis of quantum physics, the universe has a control system identical to the functional properties of the cardiovascular system of the integral organism, and for this reason elementary

particles (TU) appear everywhere at once, as erythrocytes of the cardiovascular system in all cells of the integral organism, we believe that (TU) perform functions for the Universe identical to erythrocytes and quantum physics and chemistry scientists will soon find a control system for the Universe.

It should be assumed that "Time-Universe" is a complete program of the entire Universe with its contents. This is an integral whole, where all the information about the Universe in the past, present and future is laid at the same time, i.e. it is possible to create the entire Universe of one "Time-Universe" quantum particle.

Matter and space depend on the program already embedded in the elementary particle (TU), and the form depends on the number of matter dimensions.

They cannot exist separately, because they were created according to an individual information program.

Form and space repeat matter in all its dimensions at the supramolecular level, there is no distance between matter, form and space, they cannot exist separately.

The very energy of the smallest cluster of three "Time-Universe" quantum particles can pass into matter-space. This happens according to the mystery of nature, which is not yet accessible to human knowledge.

The appearance of new matter variants depends on the size, number and location of clusters relative to each other.

There is no distance between matter and space, because space repeats the shape of matter at the supramolecular level. Thus, the "Space" preserves and holds the form of matter programmed in a "Time-Universe" particle. The surface of matter is space, which does not exist without matter.

The "Space" is a concentration of specific energy. Therefore, we are in an ultra-compact World. The smallest point visible to the naked eye is in a state of many bends, because it consists of infinitely many quantum particles ("Time-Universe") in an individual unique arrangement of their combinations.

According to certain laws of Nature, clusters of elementary indivisible particles are formed in the process of the Universe with an immediate change in their physical properties.

When infinitely different clusters of elementary particles are formed, all the parameters of the "Time-Universe" undergo infinite changes in speed and scale, i.e., the "Time-Universe" is an elementary indivisible particle provided with a program for instantaneous transformation of its physical properties according to the category of the cluster included in it.

Space creates a compact, comfortable state of the contents of the entire Universe, since elementary particles and the most gigantic clusters of stars in it are in a single space; where everything is in dense and inseparable contact.

This should be understood and represented as follows: the inner space of the animal and plant kingdoms, the entire biosphere, planets, stars, visible and invisible formations of the entire Universe is a single integral space and each elementary particle is felt in this space with infinitely different scale and speed. Space should be conceived as the outer surface of matter.

These mysteries of nature are embedded in the elementary particle (TU).

When some matter of the Universe is created, the differentiated formation of clusters of elementary particles (TU) occurs according to the program of nature, which is incapable of being conceived. These mysteries are not recognized by the humankind, each elementary particle (TU) is unique in its three-dimensional change and with individual properties, being the guarantor of the eternity of motion.

It should be noted that in all systems of the Universe, from elementary particles to giant galaxies, there is only one type of motion "forward" and two turns "right" and "left", so the numbers are always positive, no negative numbers exist.

Perhaps scientists have accepted negative numbers conditionally, for the convenience of the development of various scientific disciplines.

It should be noted that the number "0" does not exist either at the human level of knowledge, because we are not the creators of the World. We don't know the beginning. Any movement is cyclical and infinite. The maximum approach to the beginning of the cycle is accompanied by an explosive release of energy, as the maximum approach of the cycle end to its beginning is the largest "energy difference".

And part of this huge energy again gives rise to the next cycle of movement, and the most of the energy replenishes the energy of the Universe and so it continues endlessly. This concept proposed by us, confirmed by the study of three-body  $\beta$ -decay process during the 20 - 30s of the twentieth century, i.e., in addition to the electron (positron) recorded during the experiment, an electron antineutrino or neutrino flies out during  $\beta$ -decay. Neutrino (antineutrino) has zero charge, participates only in weak interaction and, as a consequence, is characterized by very weak interaction with substance. This is the "quantum touch".

All cycles are unique in speed and scale. This is also one of the elements of the eternity of the outside World. The universe does not expand and does not contract, but performs its cyclic processes, where each cycle has a beginning and an end. Scientists see a cyclical process only.

A man is a sophisticated energy-information exchange system and the condition of his/her existence is the preservation of stability of the internal environment or homeostasis.

From the point of view of quantum physics, homeostasis is a comfortable feeling of a single integral organism at the supramolecular level.

In the literal sense, the "constancy" is stagnation, it contradicts the laws of physics, gravity.

From the point of view of quantum physics, the "space" is the preservation of a comfort and unique difference between the internal stabilizing force of the integral organism and the outside world as an integral super-perfect stabilizing field (USPSF) of the Universe.

This is the general homeostasis of the Nature and the Cosmos, the guarantor of eternity of the Universe.

The scientists of classical physics call it "energy", while from the point of view of quantum physics, it is called "ISPSEIF"- integral super-perfect stabilizing energy-informational field that contributes to the creation of matter, being always in stable tension (tone) for the harmonious coexistence of the entire contents of the biosphere and the Cosmos, consisting of elementary particles, i.e. supporting the homeostasis of the Universe.

Elementary particles (TU) with a set frequency and energy information for their further actions are suddenly released from the "perfect energy-informational field" to create a new form of the matter.

The interconnection of the outside world and the integral organism is carried out through a perspiration system from the entire surface of the body of the integral organism, i.e. the exchange of information between the outside world and the integral organism at the supramolecular level is carried out freely. Consequently, according to the doctrine of the great Russian scientist V.I. Vernadsky, a man is in the biosphere, i.e. direct contact of the perspiration system of the integral organism and the special system of the Universe exists, therefore (TU) appear everywhere at once.

In this regard, any elementary particle of an integral organism is connected with all elementary particles of the Cosmos, i.e. there is an interchange of information.

It is known that we communicate with the Universe through the vibration of words, emotions and thoughts when we make choices and perform certain actions.

Events are the language of the Universe, so it is very important to perceive and understand the signs sent in response to us by the latter.

Vibrations resembling it, are called "strings" of energy by the scientists, though we call them "Time-Universe" (TU).

This energy is constantly passing through us and moving around us.

We ourselves, as radio stations, constantly transmit energy signals about ourselves to the outside space.

Whether we realize it or not, each of us participates in the continuous energy exchange of the Universe.

The individual energy field of a man is like a "passport" for the outside world.

Substance is one of the forms of matter made of fermions or containing fermions along with bosons, has a rest mass, unlike some types of fields, such as electromagnetic fields. Substance is a form of matter of a certain composition, consisting of molecules, atoms, and ions.

It should be assumed that the form of matter of a specific, definite composition is embedded in the program of an elementary particle (TU), as any substance consists of a various number of clusters of elementary particles, their schematic arrangement within the clusters and relative to the outside world, being an infinite number of variants, i.e. the concreteness of the substance depends on it. "A molecule is the smallest particle of a particular substance that preserves its chemical properties."

This also depends on the clusters of elementary particles (TU), their schematic location and quantity, this determines the specificity of the substance. For this reason, it is not possible to chemically separate the atom.

An atom or a group of atoms can be charged electrically – this is already an ion.

Ions determine the properties of a substance, its possibilities of various transformations and phenomena, without disturbing the homeostasis of the outside world.

This is done thanks to the existing infinitely many variants of the program embedded in the elementary particle (TU). The particles that make up this substance, depending on the electromagnetic forces of interaction, are in constant motion.

It is believed that the separation of particle motion into kinetic and potential is artificial. In nature and throughout the Universe, initially, the rest energy does not exist. If we can record the motion of elementary particles with an equipment, then there is no state of rest, but there is an oscillatory motion of low speed and scale. The emergence of new variants of the physical properties of energy and, consequently, infinitely many different variants of

the types of matter-space depends on the size, number and location of clusters in relation to each other (infinitely many variants).

"Time-Universe" (TU) with a set frequency and energy information for their further actions are suddenly released from the "perfect energy-informational field" to create a new matter

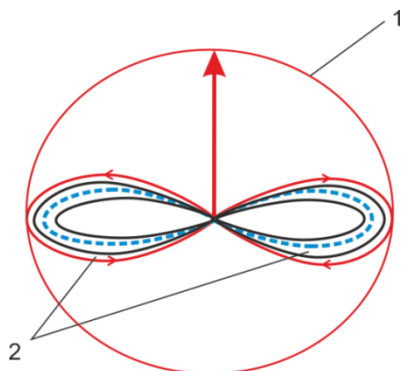


Fig. 2. Scheme of the "Universe".

- 1). "Universe."
- 2). SEIP - "Time-Universe" (TU).

According to A.L. Chizhevsky "an obligatory condition for the life of a living organism is the exchange of the "electrical" component being the foundation of metabolism process, and that the total energy content in the cellular structures of the organism has a strictly defined meaning". [1]

Bioelectric potential for each human being is strictly individual both in norm and pathology. In this regard, any nosology causes in each individual a deviation of his or her bioelectric potential in accordance with the stage of disease development, i.e. progression of intermediate states of the organism with certain disorders of its supramolecular structures.

This, in turn, determines the clinical picture at the time of examination of the patient and constitutes the leading condition for choosing the right treatment strategy for any medical specialist, so that the regression of the disease is accompanied by the restoration of destroyed supramolecular structures, excluding new gross disturbances at any level of the integral organism.

This concept is not the main principle for drug therapy due to the lack of highly informative

research methods: frequency, dose, mechanism of action of pharmacological preparations at the supramolecular level.

Clinical physiotherapy is closely connected with the other fields of the medicine, physics and biology.

Thus, the revealing of etiology and pathogenesis of many diseases allows not only the application of the necessary physical factor, but also the development of a rational method, its application, combination with other physical factors [2, 3, 4, 5].

The achievements in physics and development of highly sensitive equipment made possible determination of the mechanism of action of low-energy physical factors on cellular and subcellular level of the organism [6, 7, 8].

It is established that when any electromagnetic wave passes through the fiber, evanescent waves are always formed around the fiber perpendicular to the outer surface of the fiber and they fade at a distance from it.

These previously unknown properties of light have been recently discovered by scientists from Japan, USA, Ukraine and Korea [9].

In this regard, we have conducted a number of experimental studies (recording of standing evanescent wave photons on the surface of the skin after exposure to PVIP (Polychromatic Visible and Infrared Polarized) light of 480-3400 nm).

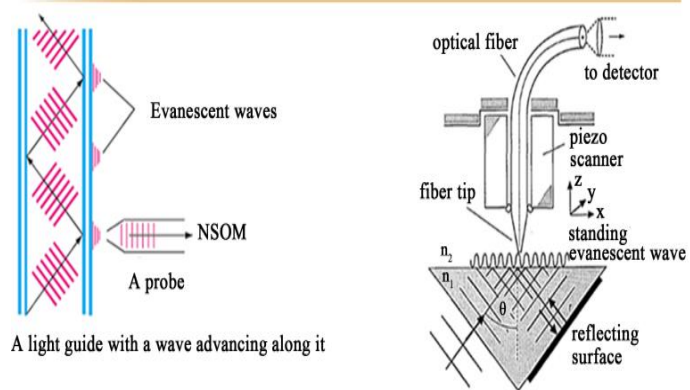


Diagram of measuring the state of a light wave advancing along the light guide. Damping evanescent waves exist near the light guide's surface (this, in fact, is the near field area). By using the NSOM probe it is possible to transform a small amount of photons from the near field into the measured signal.

Diagram of registering photons of a standing evanescent wave bonded with top prism surface using a scanning tunneling photon microscope.

Fig. 3 Evanescent waves.



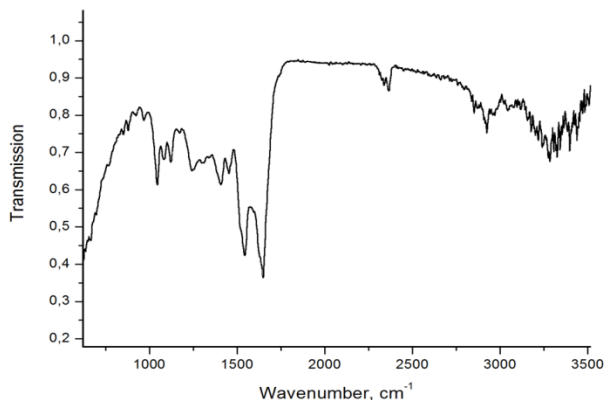


Fig. 4. IR spectrum of the skin after hand exposure to yellow light through the optic fiber cable during ten minutes.

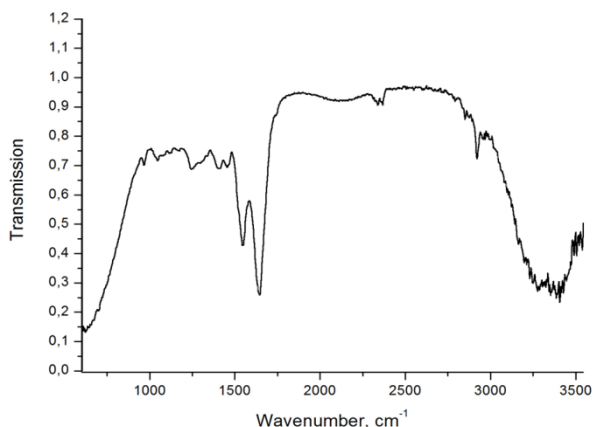


Fig. 5. IR spectrum of the skin after hand immersion into the water irradiated by yellow light through the optic fiber cable during ten minutes.

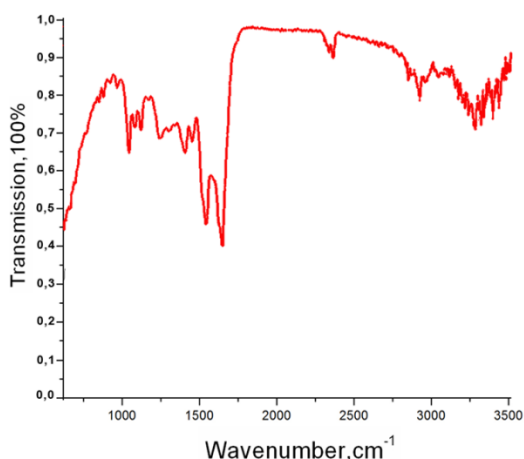


Fig. 6. IR spectrum of the skin after hand exposure to polarized light emitted by Bioptron apparatus during 10 minutes.

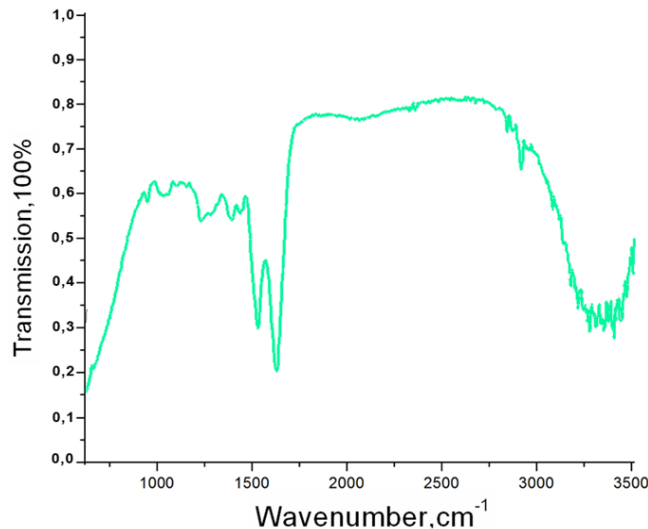


Fig. 7. IR spectrum of the skin after hand immersion into the water irradiated by Bioptron emitted light during 10 minutes.

It was established that the evanescent infrared spectra of the skin after exposure to water activated by light through the fiber optic cable from Bioptron device demonstrate an increase in the absorption area in the wavelength ranges from 3200 to 3500  $\text{cm}^{-1}$  and in the range up to 800  $\text{cm}^{-1}$ , i.e. there is an increase in hydration [ 10,11, 12, 13].

In this regard, there is a substantiation to use photoradiation therapy with Bioptron device through fiber optic cable both under direct exposure and indirectly, i.e. through water, for treatment of various diseases of the musculoskeletal system, skin and other organs and systems.

Based on the above experiments, it is possible to conclude that the photoexcitation of water by Bioptron source indeed results in changes of water structure. This was made possible by absorbing the radiation from the source in the water, stimulating the growth of water nanoclusters linked by hydrogen bond, which, in its turn, was made possible by revealing the unusual properties of light by the abovementioned scientists (emergence of evanescent waves) and creation of "scanning tunnel microscope". (Dr. Stephen Mendak and colleagues from Germany created a working tool able to reconstruct 2D images of 3D nanoscale objects using visible and near-infrared light. The device was

based on the "super lenses" made of thin silver strips in the form of a tube with center opening of about 2 μm. The evanescent waves pass from the inner surface of the tube through its layers outwards, perpendicularly to the circle, while the primary picture zoom takes place, i.e. "scanning tunnel microscope") [9]

It is established in papers [11,12,13,14] that the cardiovascular, nervous and lymphatic systems can be light guides and with evanescent (attenuating) waves formed around them, perpendicular to the outer surface of vessels, capillaries, nerve roots when exposed on any part of the skin surface to electromagnetic waves. Therefore, evanescent IR spectroscopy of disturbed total reflection when touching an IR fiber is a unique, non-traumatic, not requiring special skin preparation "Blood Spectrum Biopsy", which reflects the entire information image of the organism at the supramolecular (atomic) level (Fig. 7,8,9,10,11,12).

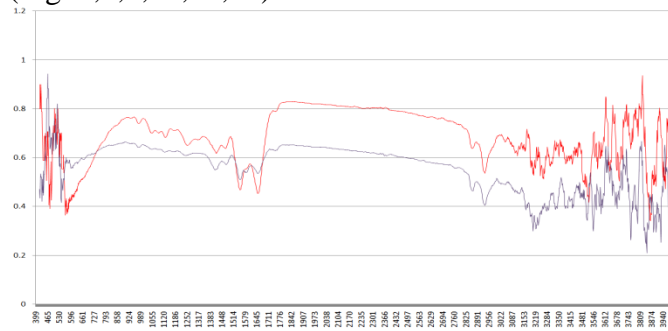


Fig. 8. Blood spectrum biopsy from the surface of an unirradiated hand.



— Palm surface  
— Back surface

Fig. 9. Spectrobiopsy of blood from the surface of a hand irradiated with yellow light for 10 min.

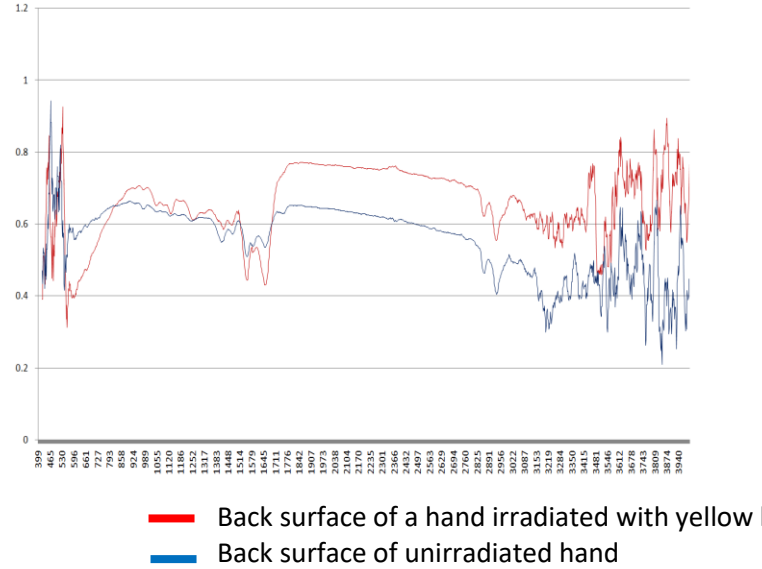
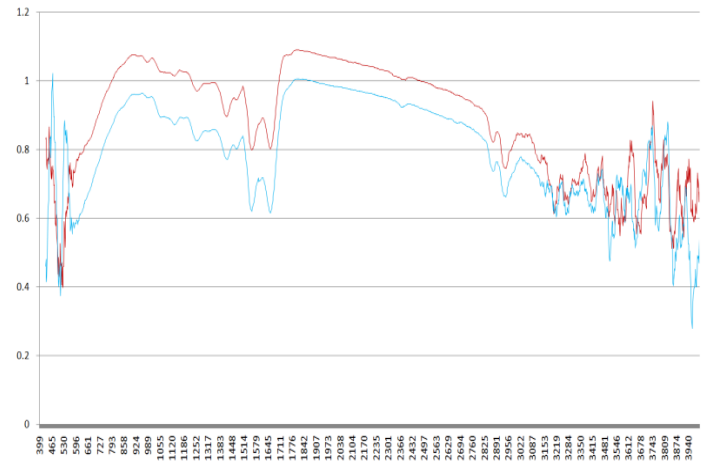


Fig. 10. Blood spectrum biopsy from the surface of a hand.



— Hand surface after removing two layers of skin with adhesive tape irradiated with yellow light for 10 minutes.  
— Back surface after removing two layers of skin with adhesive tape irradiated with yellow light for 10 minutes.

Fig. 11. Blood spectrum biopsy from the surface of a hand.

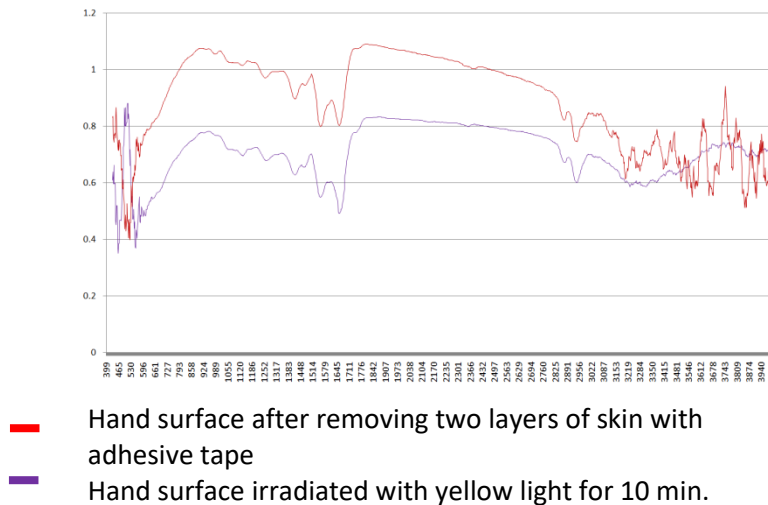


Fig. 12. Blood spectrum biopsy from the surface of a hand.

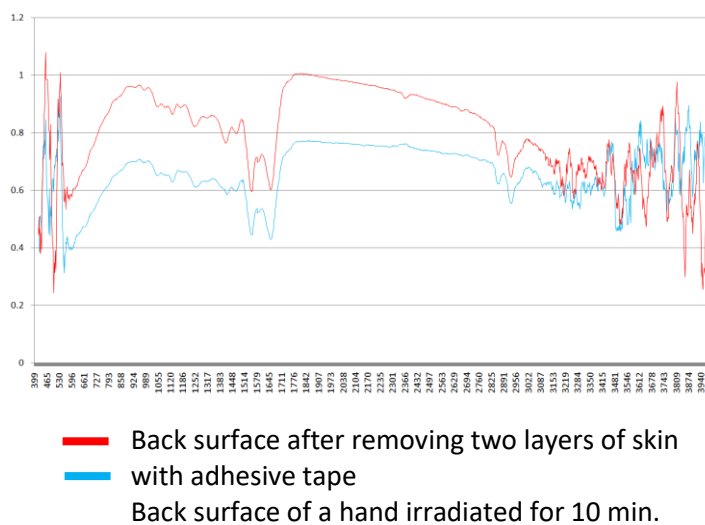


Fig. 13. Blood spectrum biopsy from the surface of a hand.

Our concept of the emergence of the tunnel effect of an integral organism under the effect of low-energy electromagnetic waves is supported by the work of domestic and foreign scientists. The causes of emergence of evanescent waves were revealed by: Doctor of Physical and Mathematical Sciences, Professor German Nikolaevich Zhizhin, Doctor of Physical and Mathematical Sciences, Professor Evgeny Andreevich Vinogradov, V.N. Galinsky,

A.I. Furs, L.M. Barkovsky et al. They believe that when photons and elementary excitations of the environment interact, polaritons are formed. The interaction of electromagnetic waves with excitations of the environment (phonons), leading them to bond, becomes especially strong when their frequencies and wave vectors coincide (resonance). In this region, connected waves, i.e. polaritons at the interface of two environments are formed and attenuate exponentially with distance from the interface (near field). Phonon is a quasi—particle introduced by the Russian scientist Igor Tamm representing a quantum of vibrational motion of crystal atoms.

Scientists discovered pseudoparticles traveling on the surface of photosensitive materials.

It is known that the English physicist B. Josephson predicted DC and AC effects in superconductor-dielectric contact in 1962, based on the Bardeen-Cooper-Schrieffer theory of superconductivity.

Two superconducting layers separated by a negligibly thin, only a few atoms thick, insulator layer will act as an integral system.

When a current, which value does not exceed the critical one, is passed through the contact, there is no voltage drop at the contact (despite the presence of a dielectric layer).

This effect is caused by the fact that conduction electrons pass through the dielectric without resistance due to the tunneling effect. Electrons can pass through the barrier even in the absence of voltage applied to them (tunneling of the Cooper pair). The effect was called the "DC Josephson effect" [16].

If a constant voltage is applied on both sides of the passage, quantum mechanics predicts that Cooper pairs of electrons will begin to move through the barrier first in one direction, and then in the opposite direction, resulting in an alternating current, which frequency increases as the voltage increases. This effect was called the "AC Josephson effect" [15, 16].

According to the laws of physics, when an integral organism is exposed to the electromagnetic waves, evanescent waves are formed from the outside of all

capillaries, vessels, nerve trunks and roots, being many "scanning tunneling biomicroscopes", and the registration of the effect of PVIP light to the organism is carried out using a "scanning tunneling photon microscope", see Fig. 1 (phenomenon of Fermi-Pasta-Ulam: "reverse energy return").

Therefore, it should be assumed that the animal organism is an integral superconducting system operating on the principle of the Josephson effect in superconductors.

In this regard, it stands to reason that we have identified new, previously unknown mechanisms of the effect of weak electromagnetic waves to the integral organism and ways of record of the organism's responses. It means that the integral organism functions according to the principle of a "scanning tunneling near-field biomicroscope", as it corresponds to the description of the device by Stefan Mendek from Germany.

cardiovascular, nervous and lymphatic systems can be light guides and with evanescent (attenuating) waves formed around them, perpendicular to the outer surface of vessels, capillaries, nerve roots when exposed on any part of the skin surface to electromagnetic waves, i.e. the integral organism enters the "scanning tunneling microscope" mode of operation, therefore evanescent IR spectroscopy of disturbed total reflection when touching an IR fiber is a unique, non-traumatic, and not requiring special skin preparation "blood spectrum biopsy", which reflects the entire information picture of the organism at the atomic level. (A new progressive trend in medicine). [6,7,8]

Professor K.A. Samoilova states in her research that the most important role in the stimulating effect of optical radiation on cells and tissues is assigned to two light-absorbing enzyme complexes with oxidant properties - nicotine-adenine-dinucleotide-phosphate oxidase (NADP-oxidase) and nucleotide-containing bipteroflavoprotein-NO-synthase. Under the action of visible and IR light, these enzymes localized in the cell membrane are activated and, using the surrounding oxygen, produce its reactive intermediates (ROIs) – superoxidation, hydrogen peroxide, hydroxyl

radical and nitric oxide (NO). It is these highly reactive molecules that conduct a light signal from the surface of the irradiated cell to its nucleus, acting on specialized intracellular mechanisms of the activation signal.

It has already been established that the formation of nitric oxide – NO – in the systemic circulation is the most important mechanism of such effects of visible and IR light as dilation of blood vessels and platelet disaggregation, without which phototherapy could hardly be highly effective. [17]

Before discussing the specific examples of manifestation of biological activity of NO in humans and animals, it is necessary to point out again the multifunctional nature of its action, which cannot be reduced only to "positive" or only to "negative" effects. [18,19,20]

The biological response to NO is determined to a large extent by the conditions of its generation – where, when and in what quantity this compound is produced. [19,21]

It should be noted that to-date the following have not been sufficiently studied: localization, distribution of NO-synthase, non-enzymatic formation of nitric oxide, participation of NO in the nervous system regulation, in protective immunological reactions, participation of NO in the activity of the central nervous system (CNS), role of nitric oxide as a regulator of cellular processes in the formation of multiple organ failure.

Based on the above, it should be stated that there is a need to expand fundamental research on the basis of an academic research institute with the involvement of specialists in physics, chemistry, cytology, physiology, biology, optical physics to create a methodology with the subsequent development of a topic and a program of slowing the natural aging of a living organism.

The above concepts were confirmed with a high statistical accuracy by example of a new rehabilitation technology: "Underwater horizontal traction of the spine with underwater photoradiation therapy" to solve an essential medical and social problem: □ treatment of patients with degenerative and dystrophic lesions of the lumbosacral spine with

herniated protrusions of intervertebral discs, being one of the most common neurological pathologies worldwide.



Fig. 14. Unit for underwater horizontal spine traction with underwater phototherapy through a fiber optic cable.

At the present stage of development of rehabilitation medicine, a wide inventory of medicinal and non-medicinal methods (physiotherapy, traction and manual therapy, reflexology, therapeutic physical training), as well as surgical (operative) treatment is used for the treatment of this category of patients. However, it is not possible to achieve the desired therapeutic effect by the applied methods, due to the inefficacy of their combined use [9,10,11,22].

Meanwhile our system, "the joint use of underwater horizontal spine traction with underwater phototherapy via fiber optic cable" can contribute to restoration of impaired functions in 96-98% of patients with degenerative-dystrophic lesions of the spine, due to the regression of herniated protrusion of intervertebral discs by 30-50% and anti-inflammatory antioxidant effect of underwater phototherapy, but to date, such a complex has not been used anywhere in the world for this pathology.

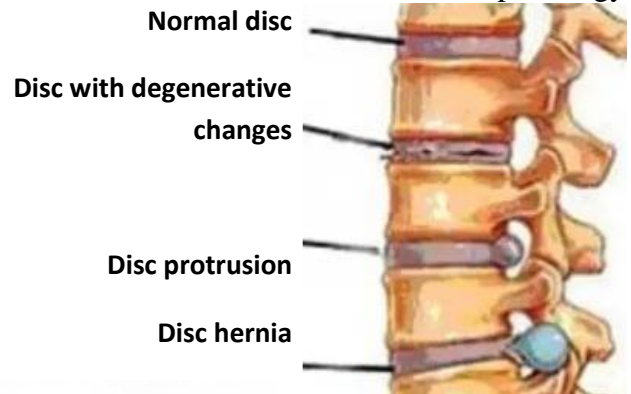


Fig. 15. Degenerative and dystrophic changes of the spine.

At the same time, the repeated appealability within 5-7 years is only 0.5%, and the pain passes off in all patients after the first procedure. This effect is due to the unique combination of underwater horizontal spine traction and underwater phototherapy (yellow light with infrared light at 480-3400 nm) through a fiber optic cable [10].

The reliability of treatment outcomes is supported by the use of modern highly sensitive informative methods for assessing the condition of intervertebral discs (MRI and CT) *and pathological morphological processes using blood plasma spectroscopy, blood spectrum biopsy from the skin surface for the first time in world healthcare practice.* [13,22]

It should be noted that the presented restorative technology surpasses all existing pharmaceutical products, non-drug treatment methods and occupies a well-deserved *dominant place in the primary prevention of degenerative-dystrophic spinal lesions of adolescents, athletes, drivers of road, railway and other modes of transport with a*

***driving labor duration of more than 60 minutes per day.***

We believe that the high efficacy of anti-inflammatory immunomodulatory, antiviral and antitumor effects of polarized light at 480-3400 nm was confirmed by fundamental research of Russian and foreign scientists: Doctor of Biology, Professor K. A. Samoilova, Institute of Cytology of the Russian Academy of Sciences, Saint Petersburg, 2003; Doctor of Medicine, Professor L. N. Gerasimova, Burn Center of the N. V. Sklifosovsky Research Institute of Emergency Medicine, Moscow; Chief Pediatric Physiotherapist of Moscow, Doctor of Medicine, Professor Khan M.A., Russian Scientific Center for Restorative Medicine and Balneology of the Ministry of Health of the Russian Federation, Moscow; Professor M. Lentz, Oxford University, UK; Professor L. Medinica, Institute of Dermatovenerology of the Clinical Center, University of Belgrade, Yugoslavia. [10,14]

A peculiarity of phototherapy performed using PVIP light is a very rapid, recorded just 30 minutes after the first irradiation, "disappearance" of pro-inflammatory cytokines - tumor necrosis factor (TNF- $\alpha$ ), interleukins-IL-6, IL-2 and IL-12 from the circulating blood. So, at the initial increased content of TNF- $\alpha$ , it drops by 30 times, IL-8 – by 4-6 times, IL-2 – by 4-10 times and IL-12 - by 12 times (by the end of the treatment course). At the same time, the levels in plasma of anti-inflammatory cytokines - IL-10 and transforming growth factor - TGF- $\beta_1$  increase, as well as a rapid six-fold increase in the blood of the most important immunomodulator - interferon- $\gamma$  (IFN- $\gamma$ ) even at its initial normal levels. The most important function of this cytokine is to activate cellular immunity (functional state of monocytes, macrophages, natural killers, and cytotoxic T-lymphocytes), which primarily increases the organism's antiviral and antitumor resistance [17].

Experience with PVIP irradiation of blood in vitro gives reason to associate all the described effects with the direct action of light on the blood. In experiments of all designs, light not just stimulates, but regulates the cytokines levels.

There is also direct contact in vivo with the cardiovascular system (blood) through perspiration. This is an instantaneous effect on the cellular, supramolecular (atomic) level [12,13,14].

In this regard, there is reason to assert that the system of underwater horizontal spine traction with underwater phototherapy, for the primary disease prevention in adolescents, sportsmen and improving the quality of life of patients with degenerative and dystrophic lesions of the spine, deserves to be promptly introduced into the practice of rehabilitation centers, medical and sports dispensaries, health resorts, departments of therapeutic physical training of healthcare institutions and boarding houses.

Based on the above, I present the tasks of clinical physiotherapy and the principles of modern classification of physical factors.

The main tasks of clinical physiotherapy.

1. Clinical tests of new physiotherapeutic methods and techniques.
2. Clinical trials and reassessment of existing physiotherapy methods and techniques.
3. Development of efficient and safe physiotherapy method.
4. Setting up information services and advisory assistance to various specialists.
5. Training of students and physicians.

In practice, clinical physiotherapy deals with the following issues:

- choice of a physiotherapeutic method for the treatment of a particular patient at the time of clinical status assessment;
- determination of the most suitable parameters of the physical factor and the mode of their application, combination with other physical factors;
- choice of ways to influence of the physical factor;
- observation of the effect of physiotherapeutic factors;
- prevention and elimination of adverse reactions.

Before prescribing treatment, a physiotherapist should give him/herself an answer to the following questions.

1. What specific changes in the patient's status does he/she want to achieve?
2. What physical factors can have the desired effect?
3. Which physiotherapy method is the most suitable for this patient?
4. In what combination and sequence should the chosen physiotherapy method be applied with other physical factors?

Ultimately, the efficacy and safety of physiotherapy depends on the ability of the doctor to correctly assess all these factors, where the latter should be based on deep knowledge of both clinical medicine and experimental physiotherapy.

"The science that studies the physical-chemical properties and mechanism of action of physical factors with the symptomatic-syndrome principle of their application in physiological parameters in the comprehensive therapy of patients; the possibility of applied physical factors to stabilize the disturbed biological process of organs and systems is clinical physiotherapy."

In order to improve clinical physiotherapy, a modern classification of physical factors needs to be created under the following principles.

#### Principle One:

By the energy source.

1. Natural:
  - Solar energy.
  - Cosmic energy.
  - Temperature (air space, water: rivers, lakes, seas, mineral waters, therapeutic muds).
  - Human endobioenergy.
  - Communication apparatus of the energy system (energy centers).
  - Ultra-stable acoustic and electromagnetic waves (solitons) in human DNA.
  - Energy of the plant kingdom.
  - Exobioenergy (leeches, bees, etc.).
2. Artificially obtained energy:
  - Electric.
  - Magnetic.
  - Light.
  - Thermal.

- Hydropower.
- Mechanical.
- Radio wave.
- Energy produced by air pressure and gases.
- Fermi-Pasta-Ulam generator (for creating soliton electrosonic fields).
- Resonance laser spectroscopy of radio wave emitters of objects, including chromosomes, living cells and tissues.
- Biomolecular-optoradioelectronic computer systems - analogs of the chromosomal biocomputer of the organism.
- IR spectroscopy in the 4000-400  $\text{cm}^{-1}$  region on the Perkin-Elmer 2000 Fourier spectrometer.
- Raman spectroscopy.
- Evanescent spectroscopy.

#### Principle Two.

In the most important areas of use of therapeutic physical factors.

1. For therapeutic purposes:
  - Natural factors.
  - Preformed factors.
2. Rehabilitation field:
  - Natural factors.
  - Preformed factors.
3. Physioprophyllaxis:
  - Primary prophylaxis - mostly by the natural factors.
  - Secondary prophylaxis – mostly by preformed factors.
4. Physiodiagnostics:
  - Electrodiagnostics.
  - Electropunctural diagnostics.

#### Principle Three.

By the physical-chemical bases of physical factors action:

1. Heat generation.
2. Ionic shifts.
3. Formation of free physical agents.
4. Generation of free radicals.
5. Conformational changes.

#### Principle Four.

By the type and mode of energy action.

1. Flows of direct current:

- Continuous.
- Impulse.
- 2. Flows of alternate current:
  - Low frequency.
  - Medium frequency.
- 3. Electric field:
  - Constant.
  - Impulse.
  - High and ultra-high frequency.
- 4. Magnetic field:
  - Constant.
  - Impulse.
  - Low frequency.
  - High frequency.
- 5. Electromagnetic radiation of radio frequency range:
  - Ultra-high frequency (centimeter and decimeter range).
  - Extreme high frequency (EHF).
- 6. Electromagnetic radiation of optical range:
  - Infrared.
  - Visible.
  - Ultraviolet (long wave, medium wave, short wave).
  - Monochromatic, coherent.
- 7. Mechanical energy:
  - Mechanical stresses (therapeutic massage, manual therapy, acupuncture).
  - Mechanical vibrations:
    - ✓ Vibration.
    - ✓ Ultrasound.
  - Airspace factors:
    - ✓ Atmospheric pressure:
      - Periodically changing.
      - Depressed.
      - Increased.
      - Partial (depressed  $PO_2$  and increased  $PO_2$ ).
      - Increased  $PO_2$  and PHe (oxygen therapy).

➤ Increased  $PCO_2$  (carbogenotherapy).

✓ Aérons.

✓ Aerosols.

Principle Five: By mechanism of action of physical factors.

Principle Six.: By ability to interact with the bioenergy of cells and tissues.

Principle Seven.: By method of administration of pharmacological agents.

Clinical physiotherapy is closely connected with the other fields of the medicine, physics and biology.

Thus, the revealing of etiology and pathogenesis of many diseases allows not only the application of the necessary physical factor, but also the development of a rational method, its application, combination with other physical factors and pharmacological agents [3,12,14].

The achievements in physics and development of highly sensitive equipment made possible determination of the mechanism of action of low-energy physical factors on cellular and subcellular level of the organism [1,9].

It is established that when any electromagnetic wave passes through the fiber, evanescent waves are always formed around the fiber perpendicular to the outer surface of the fiber and they fade at a distance from it. These previously unknown properties of light have been recently discovered by scientists from Japan, USA, Ukraine and Korea [2]. In this regard, we have conducted a number of experimental studies (recording of standing evanescent wave photons on the surface of the skin after exposure to PVIP (Polychromatic Visible and Infrared Polarized) light of 480-3400 nm).

**I dedicate my modest work to my dearest mother Princess of the Great Alania, Averi Gabolaevna Kulova-Bitsoeva.**

**With undying love, son Vladimir.**

I express deep gratitude to my family, especially to my dear granddaughter Dzerassa Margieva. As well as to Professors:



## Душевные заветы милейшей матери моей:



“Ask God in your prayer to heal the people that begraced you, always be warm-hearted and kind in praise of the Heavenly King”

“Look into the eyes and face of the servant of God, where you can see his distress, do not look onto his hands – you will drown in unholy temptations and will not be able to cure neither his soul, nor his body”.

“Keep the secrets of the people who shared them with you and do not use them for your Glory”.

“Do not chase the “Glory”, it can be neither overtaken nor embraced, it finds the ones worthy of it”.

“Be happy with the happiness of the others, feel the people’s distress and provide them with diligent help without waiting for request”.

“Your way must always be lit up and shown by your heart and mind”.

“Do not lade your Soul with worldly possessions, give it the way to move near to your God”.

A. A. Hadartsev, V. M. Byakov, A. N. Sheina, E. M. Orekhova , A. I. Shchukin, N. B. Korchazhkina, T. V. Konchugova, M. Yu. Gerasimenko, Academician V. G. Zilov.

I remember my Great teachers with deep gratitude: Professor E. P. Semenov, Professor V. S. Ulashchik and Academician Jaromir Hrbek. May the memory of them live forever.

Personal contribution of the author:

All experimental and clinical studies were performed by the author himself. All procedures of underwater spinal traction with underwater phototherapy through fiber optic cable were done for all the patients by the author. The author's contribution to this work is to expand knowledge about the biophysical facts of the therapeutic effects of polychromatic visible and infrared polarized light on the body, as well as to prove the efficacy of the combined use of underwater horizontal spine traction with underwater phototherapy.

The author pointed out the possibility of activating water and blood plasma as exposed to underwater phototherapy through the fiber optic cable with a

high therapeutic effect, which is essential for the world healthcare practice

Therefore, "Physiotherapy science" should take its rightful place among the leading scientific disciplines of the world medical science.

### Conclusions:

1. New, previously unknown mechanisms of action of weak electromagnetic waves on the integral organism and methods of recording of such waves were discovered. It means that the integral organism consists of many "scanning tunneling near-field biomicroscopes", and the results of exposure to PVIP light of the organism are recorded using a "scanning tunneling photon microscope".

2. All cells of a living organism are provided with a unique program of individual speed of infinite motion of all processes of their activity in particular and in general (i.e. transition from one state to the next ...).

3. It was established that the impact of energy of any physical factor is dosed and regulated (physiodynamics) with the help of nanotechnologies and its path is easily traced to each molecule of the integral organism (physiokinetics) without

disturbing supramolecular structures and without any negative consequences.

The modern world pharmaceutical science does not have such a high level of pharmacodynamics and pharmacokinetics.

4. It was established that biopotential for each human being is strictly individual both in norm and pathology. In this regard, any nosology causes in each individual a deviation of his or her bioelectric potential in accordance with the stage of disease development, i.e. progression of intermediate states of the organism with certain disorders of its supramolecular structures.

5. The science that studies the energy system and bioinformatic system of the organism, possibility of their correction at the subcellular level by physical factors to stabilize the disrupted biological processes of organs and systems is clinical physiotherapy.

6. It was established that any disease is unique for each man: etiopathogenesis, clinical presentation, state of intermediate cyclic morphological supramolecular formations of organs and body systems.

Therefore, the use of "established medicamentous standards for diseases" for all patients with the same diagnosis is unscientific and extremely dangerous.

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